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XXIV. *On the Effect of westerly Winds in raising the Level of the British Channel. In a Letter to the Right Hon. Sir Joseph Banks, Bart. K. B. P. R. S. By James Rennell, Esq. F. R. S.*

Read June 22, 1809.

DEAR SIR,

IN the "*Observations on a Current that often prevails to the Westward of Scilly*," which I had the honour to lay before the Royal Society many years ago, I slightly mentioned, as connected with the same subject, the effect of strong westerly winds, in *raising* the level of the British Channel; and the escape of the super-incumbent waters, through the Strait of Dover, into the *then* lower level of the North Sea.

The recent loss of the Britannia East India ship, Captain BIRCH, on the Goodwin Sands, has impressed this fact more strongly on my mind; as I have no doubt that her loss was occasioned by a current, produced by the running off of the accumulated waters; a violent gale from the westward then prevailing. The circumstances under which she was lost, were generally these:

In January last she sailed from her anchorage between Dover and the South Foreland (on her way to Portsmouth), and was soon after assailed by a violent gale between the west and south-west. The thick weather preventing a view of the *lights*, the pilot was left entirely to the reckoning and the lead; and when it was concluded that the ship was quite clear of

the Goodwin, she struck on the north-eastern extremity of the southernmost of those sands. And this difference between the reckoning (after due allowance being made for the tides) and the actual position, I conclude was owing to the northerly stream of current, which caught the ship when she *drifted* to the *back*, or *eastern side* of the Goodwin.

The fact of the high level of the Channel, during strong winds, between the W. and SW., cannot be doubted: because the increased height of the tides in the southern ports, at such times, is obvious to every discerning eye. Indeed, the form of the upper part of the Channel, in particular, is such as to receive and retain, for a time, the principal part of the water forced in; as may be seen by the sketch (No. 2): and as a part of this water is continually escaping by the Strait of Dover, it will produce a current; which must greatly disturb the reckonings of such ships as navigate the Strait, when thick weather prevents the land, or the lights of the Forelands, and the North Goodwin, from being seen.

I observe in a new publication of Messrs. LAWRIE and WHITTLE, entitled "*Sailing Directions, &c. for the British Channel*, 1808," that throughout the Channel, it is admitted by the experienced persons whom he quotes, that strong SW. winds "cause the flood tide to run an hour, or more, longer, "than at common times:" or in other words, that *a current overcomes the ebb tide, a full hour*: not to mention how much it may accelerate the one, and retard the other, during the remainder of the time.*

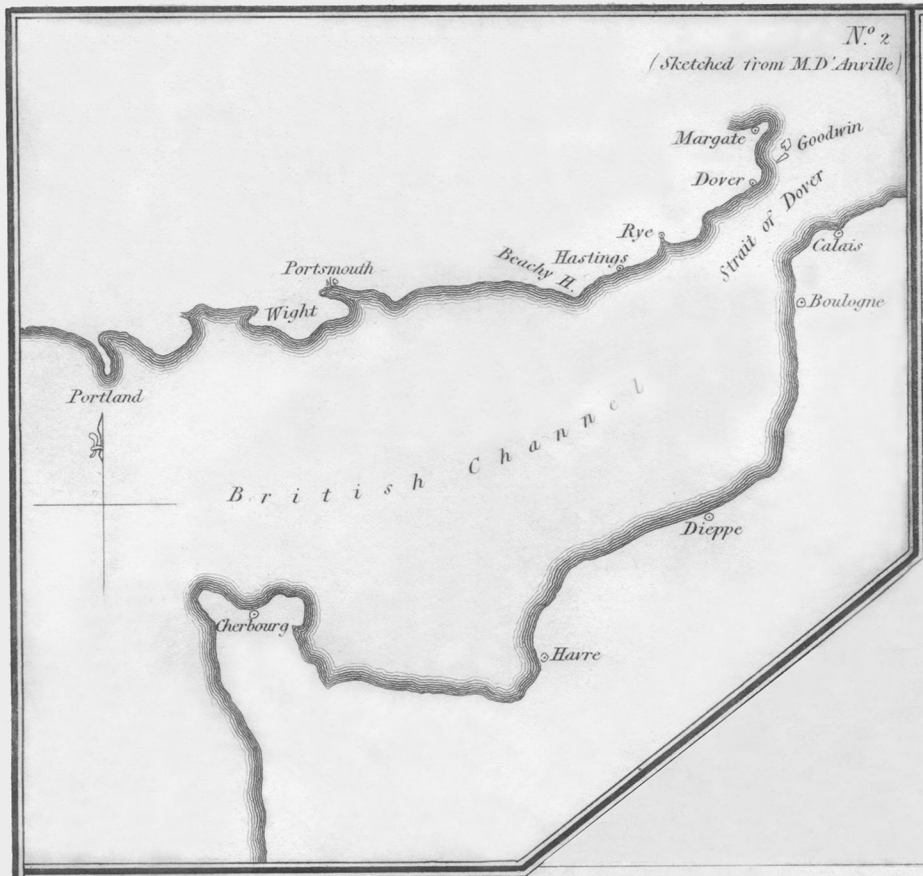
* It is also asserted, that in the mouth of the Channel, the extraordinary rise of tide, in stormy weather, is ten feet: that is, at common springs twenty, and in storms thirty feet. See pages 28, 41, 70, and 133.

It is evident, that the direction of the current under consideration, will be influenced by the form and position of the opposite shores, at the entrance of the Strait; and as these are materially different, so must the direction of the stream, be, within the influence of each side, respectively. For instance, on the English side, the current having taken the direction of the shore, between *Dungeness* and the *South Foreland*, will set generally to the north-east, through *that* side of the Strait. (See No. 1.) But, on the French side, circumstances must be very different: for the shore of *Boulogne* trending almost due north, will give the current a like direction, since it cannot turn sharp round the Point of *Grisnez*, to the north-eastward; but must preserve a great proportion of its northerly course, until it mixes with the waters of the North Sea. And it may be remarked, that the *Britannia*, when driven to the eastward of the Goodwin, would fall into this very line of current.

There is another circumstance to be taken into the account; which is, that the *shore of Boulogne* presenting a direct obstacle to the water impelled by the westerly winds, will occasion a higher level of the sea, there, than elsewhere; and, of course a stronger line of current towards the Goodwin. (See again No. 2.)

It must, therefore, be inferred, that a ship, passing the Strait of Dover, at the back of the Goodwin Sands, during the prevalence of strong W. or SW. winds, will be carried many miles to the northward of her reckoning; and if compelled to depend on it, may be subject to great hazard, from the Goodwin.

It will be understood, of course, that although the stream



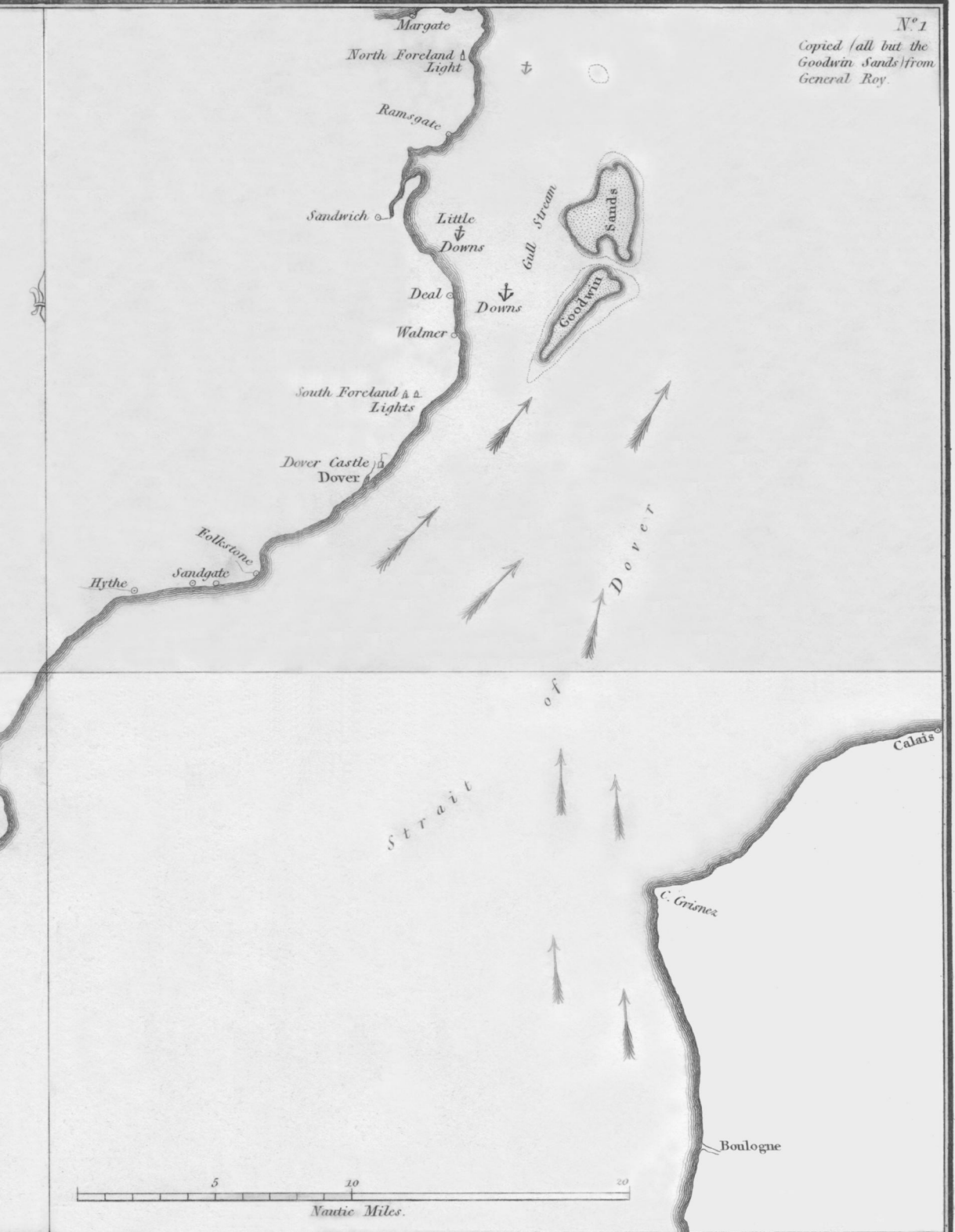
N^o 2
(Sketchd from M.D. Anville)



5 10
Nautic Miles.

N^o 1

*Copied (all but the
Goodwin Sands) from
General Roy.*



J. Basire sc.

of current, alone, has been considered here (in order to simplify the subject), yet that, in the application of these remarks, the regular tides must also be taken into the account. But from my ignorance of their detail, I can say no more than that I conceive that the great body of the tide from the Channel, must be subject to much the same laws, as the current itself. The opposite tide will doubtless occasion various inflexions of the current, as it blends itself with it; or may absolutely suspend it: and the subject can never be perfectly understood, without a particular attention to the velocity and direction of the tides in moderate weather, to serve as a ground-work.*

I am, with great respect,

Dear Sir,

your faithful humble servant,

J. RENNELL.

* MESSRS. LAWRIE and WHITTLE's publication, allows the tides in this quarter a velocity of one mile and a half per hour, at the springs; half a mile at the neaps. The Britannia's accident happened at *dead* neaps.